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Predictors of Satisfaction with Access to Medical Care

Graduate Management Project

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ABSTRACT

The purpose of this management project was to determine if there was a relationship between staffing, the number of exam rooms, clinic operating hours, ease of making an appointment; and satisfaction with access to medical care. Additionally, a predictive model was developed. The sample population came from the clinics within Brooke Army Medical Center for FY 98-99. Three types of clinics were chosen for this analysis: high cost, high volume, and high risk. Data was taken from the monthly customer satisfaction surveys for FY 98-99, the Medical Expense and Performance Reporting System from FY 98-99, and from the specific clinics. Correlation analysis and multiple linear regression were used.

The results of this study demonstrate that demographic characteristics of the sample population account for 96% of the variation in patient satisfaction with access to medical care. When controlling for differences in demographics, the total model accounts for 98% of the variation in satisfaction with access to medical care. Furthermore, the "ease of making an appointment by phone (Q10a)" was the most predictive independent variable t (26, 191) = 13.549, $p < .001$ followed by the "number of exam rooms" t (26, 191) = -2.888, $p = .004$, the "urgent visit" t (26, 191) = 2.816, $p = .005$, and 65 and older patients t = (26, 191) = 2.169, $p = .032$.

This study demonstrates a direction for improving satisfaction with access to medical care, which is making it easier for our patients to make an appointment. Additional studies should be conducted MHS wide and alternative methods of making appointments should be studied.

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INTRODUCTION

Conditions Which Prompted the Study

The Army is now smaller in size than at any time in the last 58 years (Walker & Reimer, 1998). Yet, on any given day in the Army Medical Department (AMEDD) there are 40,658 clinic visits, 477 admissions, 1,767 beds occupied, 36,645 laboratory procedures, 41,694 x-rays, 6,012 immunizations, 68 live births, and 68,998 pharmacy procedures (Office of the Assistant Chief of Staff, Resource Management, 1999). Since 1989, the Army has downsized by more than 630,000 soldiers and civilians, increased deployments by 300%, and closed more than 98 bases in the U.S. (Walker & Reimer, 1998). With those base closures, the number of Army military treatment facilities has downsized from 14 to 5 outside the continental United States, 35 to 23 within the continental United States for a total loss of 21 military treatment facilities (MTFs). Concurrently, the AMEDD force structure has decreased by 34%. Yet, the beneficiary population has only decreased by 12.5%, partly due to the changing make-up of the force. Now, 62% of our soldiers are married (Walker & Reimer, 1998) which means an increase in the beneficiary population. As of 14 December 1998, the Army beneficiary population (worldwide users) was 2,194,000 (Office of the Assistant Chief of Staff, Resource Management, 1999).

With the base closures, reduction in force, increased deployments, and a static beneficiary population, how is the Military Healthcare System (MHS) able to provide care for all of its beneficiaries? The answer is actually an evolution of the healthcare benefit that dates back to the 1940s and 1950s when Title X legislated the space available benefit to active duty family members and retirees. From there, in 1966, the

Civilian Health And Medical Program of the Uniformed Services (CHAMPUS) legislated benefit authorized civilian healthcare where MTFs did not provide a needed service or could not handle an existing need for active duty family members and retirees less than 65 years of age. Finally, in 1993, due to the military drawdown, reduction in access, and escalating healthcare costs, TRICARE came into being.

TRICARE is an integrated healthcare delivery program. The foundation of TRICARE is the MHS which makes up 70% of the program augmented by the managed care support contractor (MCSC) which accounts for the remaining 30%. Like the civilian patient seeking a managed care plan, the military beneficiary has several options available. TRICARE offers a triple-option health benefit package: TRICARE Prime, an enrolled HMO like option; TRICARE Extra, a preferred provider on a non-enrolled case-by-case option; and TRICARE Standard, the standard CHAMPUS option, similar to the traditional indemnity plan where the beneficiary receives care from a non-network provider. The beneficiary has the option to enroll in one of three options with the exception of active duty who are mandated by DoD policy as TRICARE Prime enrollees.

Additionally, much like civilian managed care organizations, the MTFs depend on the number of enrollees to their facility. In theory, the more beneficiaries enrolled with the facility or plan, the more money the plan or facility has to operate. Budgets are primarily based on the population supported thus the phrase enrollment based capitation. Therefore, it is imperative that the MTF optimize their enrollment capacity and recapture those beneficiaries that have chosen to seek healthcare outside the MHS. However, before patients will come back to the MHS, they must have access to the system.

Statement of the Problem

"Over the past decade, the DoD has faced the same challenges in delivering healthcare to its beneficiaries as the nation's healthcare system has for the general population, including increasing costs and uneven access to care"(Blair & Toolan,1999). One of the reasons for the implementation of TRICARE was to improve access to healthcare (Blair & Toolan, 1999) yet, one of the most common concerns about TRICARE is that access standards are not being met (TRICARE Management Activity, 1999). Access standards apply for TRICARE Prime enrollees only. For urgent, routine, and specialty care, the access standards are one day, seven days, and 30 days respectively (Joseph, 1995). To evaluate services provided by the MHS, two survey instruments are currently used by the DoD and Commanders, the annual Health Care Survey of DoD Beneficiaries (HCSDB), and the monthly Customer Satisfaction Survey (CSS).

These surveys prompt the question "Why do some clinics have more satisfied patients then others?" And more specifically "Why do some clinics perform better regarding satisfaction with access to medical care?" It is possible that some clinics perform better due to effective and efficient policies, resourcing and facility design.

Literature Review

Access to medical care is traditionally viewed as one of the three sides (cost, quality, and access) of the healthcare triangle (Fuchs, 1974) that is linked to satisfaction with healthcare (TRICARE Management Activity, 1999). Accessibility issues have been found to significantly affect patient overall satisfaction more than quality of care issues

(Rutledge & Nacimento, 1996). Similarly, a 1983 study by Mechanic, Weiss, and Cleary regarding why patients disenroll from their health plans, found that 56% of disenrollees were dissatisfied with the opportunity to get services, and that of all the cited reasons for disenrollment, the opportunity to get services was the most important. Even before these researchers, however, access to medical care has been a concern.

In past decades, the United States government has introduced programs to improve access to medical care. These programs included increasing the number of medical facilities, providing coverage to special populations, increasing the number of medical professionals, and the distribution of medical manpower. The Hill-Burton Act of 1946, provided federal monies to the states to expand or build hospitals. In 1966, the government began financing healthcare to those over the age of 65, as well as the indigent and the poor, when the amendment to the Social Security Act introduced Medicare and Medicaid. In 1963, the Health Professions Education Assistance Act provided federal support for the construction and expansion of medical schools, as well as loans for medical students (Sloan, Blumstein, & Perrin, 1990). In 1970, the Emergency Health Personnel Act created the National Health Service Corps and authorized assignment of Federal personnel to medically underserved areas. In 1972, Congress passed an amendment to the Emergency Health Personnel Act that would increase the number of physicians serving in underserved communities by providing scholarships for health professionals in return for service to these underserved communities (National Health Service Corps, 1999). In more recent years, President Clinton, in 1994, attempted to guarantee universal access to healthcare with his Health

Security Act. However, the number of facilities, professionals, and their distribution only partly define access.

Aday, Anderson, and Fleming (1980) define access as “those dimensions which describe the potential and actual entry of a given population group to the health care delivery system.” Kerr, Hays, Lee, and Siu (1980) divide access into three components: access to specialty care, access to hospital and emergency room care, and convenience of care where convenience of care is defined as such variables as waiting times for appointments, and choice of provider. Davis and Hobbs (1989) include waiting room time, and flexibility of clinic hours under the term of access. Ware, Snyder and Wright (1983) describes access as all those factors in arranging for healthcare. Donabedian (1988), Aday and Anderson (1974) describe access as structure and include human resources, and facilities. Aday and Anderson (1974), however, also include organization as a variable of access. Organization refers to the controls, procedures, and policies regarding the provision of medical services.

This study proposes to look at each of the three categories – Policy, Resources, and Facility Redesign as they affect satisfaction with access (Aday & Anderson, 1974; Davis & Hobbs, 1989; and Donabedian, 1988) within Brooke Army Medical Center (BAMC). Specifically, the study will look at several factors: staffing in each of the selected clinics (resources), the number of exam rooms (facility redesign), the number of hours the selected clinics operate per month (policy), the ease of making an appointment (policy), the waiting time to get an appointment (resources), and their effects on satisfaction with access.

In a 1995 study by The Advisory Board Company, primary care clinics (both on and off-site from their hospital) were staffed with ratios ranging from 2.4 to 4.5 support staff to provider. A staffing study conducted specifically for the military by Booz, Allen and Hamilton (1998) utilized the MGMA Cost Survey to determine the staffing ratios to support the Fort Campbell community. Their study revealed 5.06 total support staff per FTE provider. However, this figure included support services provided outside the clinic (medical secretaries, medical records, laboratory, business office, information management services, physical therapy, optical, other medical/ancillary services, and radiology) or that were provided for by a separate contract (housekeeping /maintenance). When these support staff are subtracted out from the total, the ratio becomes 2.49 FTE support staff per provider.

The number of exam rooms that a provider has or does not have can affect patient access and productivity. Without the proper number of exam rooms, the effective flow of work can be reduced because of the inability to efficiently organize tasks, thereby decreasing access. Additionally, providers that lack designated exam rooms are unable to adapt the rooms to their patients' needs, such as by displaying appropriate educational materials, which can further decrease productivity and access. In some cases, makeshift exam rooms can also hinder privacy of communications and confidentiality of patient information such as telephone conversations, and staff consultations (Lindeke, Hauck & Tanner, 1998). The DoD Space Planning Criteria states that each physician, physician's assistant, and clinical nurse practitioner should have a private office and that each doctor programmed should have two exam rooms.

An assumption is that physician's assistants and clinical nurse practitioners in primary care would also have two exam rooms per provider.

The number of hours a provider is available to see patients may impact the number of patients seen. According to Wolinsky and Marder (1985) physicians ranged from 173.2 patient care hours per month in group and staff model HMOs to 182 patient care hours per month in a group fee-for-service practice setting. In 1997, Moskowitz (2000) reported the average hours spent per week on professional activities, including patient as 57.5 or 230 hours per month.

Several studies have found that patients report higher satisfaction levels when there are fewer problems encountered trying to make an appointment (Gravely & Littlefield, 1992; Kurata, Nogawa, & Phillips, 1992). Additionally, Jatulis, Bundek, and Legoretta (1997) identified the strongest predictor of satisfaction with access to care as the ease of arranging appointments.

In the literature review, wait time or access standards were not defined. However, the military does have defined access standards. The TRICARE Management Activity has defined the access standards or maximum wait time to get an appointment as the following: for urgent, routine, and specialty care, the access standards are one day, seven days, and thirty days respectively (Joseph, 1995).

Purpose

The purpose of this study was to determine if there is a relationship between "Satisfaction with access to medical care (Q10b)" and "number of providers," "number of ancillary staff," "number of operating hours," "number of exam rooms," "ease of making

an appointment by phone," and "wait time to get an appointment" while controlling for demographic variables. The objective of the research was to develop a predictive model to guide MTF Commanders in facility redesign, allocation of limited resources, and the development of effective policies that will provide the greatest beneficiary satisfaction.

METHODS AND PROCEDURES

Persons, Objects, or Events

The persons, objects, or events for this study were the 37 outpatient clinics within BAMC for the 24-months of fiscal years (FY) 1998 and 1999. From the 37 outpatient clinics, nine clinics were originally chosen based on three criteria (a) high volume, (b) high cost, and (c) high risk (M. Perry, LTC, personal communication, February 29, 2000). High volume clinics were defined as those clinics with the most outpatient visits. High cost clinics were defined as those clinics with the most expensive product line. High-risk clinics were defined as those clinics with the lowest mean satisfaction with access score.

To determine which of the clinics were high volume clinics, data was collected from the FY 98-99 Worldwide Workload report. The clinics with the most visits in that 24-month period were the Primary Care Clinic with 173,015 visits; the Internal Medicine Clinic with 89,535 visits; and the Pediatric Clinic with 84,300 visits.

The high cost clinics were determined utilizing Medical Expense and Performance Reporting System (MEPRS) data from FY 99. The clinics with the highest cost per visit

were the Cardiovascular and Thoracic Clinic at $688.74 per visit; the Plastic Surgery Clinic at $435.29 per visit; and the Emergency Medicine Clinic at $433.75 per visit.

The high-risk clinics were identified as those clinics with the lowest mean satisfaction with access to medical care score from the CSS for FY 98-99. The high-risk clinics were the Family Practice Clinic with a score of 3.17, the Gynecology Clinic with a score of 3.62, and the Orthopedic Clinic with a score of 3.63.

From the original nine clinics, the Emergency Medicine Clinic was deleted because the Emergency Medicine Clinic is open 24 hours a day and appointments are not required.

Finally, all staffing data was taken from the MEPRS FY 98 and 99. Satisfaction with access, ease of making an appointment, wait time, and demographic data was taken from the CSS for FY 98-99. Each clinic studied was visited to gather the number of exam rooms and operating hours. The head nurse, noncommissioned officer-in-charge (NCOIC) or the assistant NCOIC were asked how many exam rooms the clinic had and the operating hours.

Operational Definitions

The dependent variable (Y) “Satisfaction with access to medical care (Q10b)” is question 10b from the CSS, “How would you rate the specific clinic on access to medical care whenever you need it?” Question 10b was coded 1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent. Clinic “satisfaction with access” scores were aggregated by month and monthly mean values were used.

The independent variables (X) were ease of making an appointment, wait time, the number of providers, the number of ancillary staff, the number of operating hours when providers are available, and the number of exam rooms. The independent variables (X) "ease of making an appointment by telephone (Q10a)" and "satisfaction with wait time" were defined by the CSS questions 10a and 6 respectively. Question 10a asked, "How would you rate the specific clinic on ease of making an appointment by phone?" Question 10a was coded 1=poor, 2=fair, 3=good, 4=very good, and 5=excellent. Question 6 asked, "How many days were there between the day the appointment was made and the day you saw the provider?" Question 6 was coded 0 = no appointment, 1 = same day, 2 = 1 day, 3 = 2-3 days, 4 = 4-7 days, 5 = 8-14 days, 6 = 15-30 days, and 7 = more than 30 days. Again, clinic scores were aggregated by question and then by month to get the mean monthly values that were used.

The "number of providers" was defined as the number of provider FTEs per man-month. Provider was further defined as doctors (including residents, staff, interns, and fellows) nurse practitioners, or physician's assistants. Available provider hours were totaled by month and then divided by 168 hours to calculate the FTEs per man-month. The "number of ancillary staff" was defined as all other direct care professionals, registered nurses, paraprofessionals, administrative and logistical personnel assigned to the identified clinic. Like the provider staff, available ancillary hours were totaled by month and then divided by 168 hours to calculate the FTEs per man-month.

"Operating hours" was defined as the number of hours the clinic was open and providers were available to see patients during a four-week month. Finally, the "number

of exam rooms" was defined as the total number of exam rooms in the clinic. Provider's offices were included if there was an exam table in their office.

Specific demographic variables were controlled for in the model. The demographic variables included in this study were gender, age, rank, beneficiary category, enrollment category, health status, and purpose of visit. All demographic data came from the CSS and monthly mean values were used.

Demographic data was organized and coded as mutually exclusive categorically exhaustive. "Gender" was defined and coded 1 if male, 0 otherwise. "Age" was coded 1 if the age was present, 0 otherwise for the following categories: "0-17," "18-34," "35-64," "65 and older." "Grade" was coded 1 if present, 0 otherwise for the following categories: "Enlisted (E)1-4," "E5-9," "Warrant Officer," and "Officer." "Beneficiary category" was defined and coded 1 if present, 0 otherwise for the following categories: "active duty military," "National Guard or Reservist," "retired military," "dependent of active duty military," and "dependent of retired military." "Enrollment " referred to whether or not the patient was enrolled in TRICARE Prime and is taken from question 14 on the CSS. "Enrollment" was coded 1= TRICARE Prime enrollee, 0 = otherwise. "Health status" is a self-determined, characterization, of one's overall health and refers to question 17 from the CSS, which asks, "In general, what would you say your health is?" Question 17 was coded 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent. Finally, although not necessarily a demographic variable, I wanted to control for the "purpose of the visit." Question 1 from the CSS asks, "What was the main purpose of your visit on date to the specific clinic?" The "purpose of the visit" was coded 1 if

present, 0 otherwise for the following categories: “urgent care,” “routine/non-urgent care,” “preventive care/check-up,” and “specialty care/referral visit.”

Functional Equations/Model

The hypothesized model was that “Satisfaction with access to medical care (Q10b)” is a function of “ease of making an appointment,” “number of days to get an appointment,” “number of providers,” “number of ancillary staff,” “number of operating hours when providers are available,” and “number of exam rooms” (while controlling for demographics). Using monthly mean values by clinic, the functional equation was:

$$Y = B_0 + B_{purp}X_{purp} + B_{enr}X_{enr} + B_{gen}X_{gen} + B_{age}X_{age} + B_{grad}X_{grad} + B_{BenCat}X_{BenCat} + B_{Health}X_{Health} + B_eX_e + B_wX_w + B_pX_p + B_aX_a + B_hX_h + B_xX_x + e$$

Y = satisfaction with access to medical care (Q10b)

B_0 = intercept

B = coefficient

X_{purp} = Purpose of visit (Q1)

- Percent of Urgent visits by month
- Percent of Routine visits by month
- Percent of Specialty Care visits by month
- Percent of Check-ups by month

X_{enr} = Enrolled (Percent enrolled in TRICARE Prime by month)

X_{gen} = Gender (Percent male by month)

X_{age} = Age

- 0-17 (Percent by month)
- 18-34 (Percent by month)
- 35-64 (Percent by month)
- 65 + (Percent by month)

X_{grad} = Grade

- E1-4 (Percent by month)
- E5-9 (Percent by month)
- Warrant Officer (Percent by month)
- Officer (Percent by month)

X_{BenCat} = Beneficiary Category

- Active Duty Military (Percent by month)
- Guard/Reserve (Percent by month)
- Retired Military (Percent by month)
- Dependent Active Duty Military (Percent by month)
- Dependent Retired Military (Percent by month)

X_{Health} = Health Status (Q17 - Percent by month)

X_e = Ease of making an appointment (Q10a – Percent by month)

X_w = Wait time to appointment (Q6 – Percent by month)

X_p = Number of providers (FTEs per man-month)

X_a = Number of ancillary staff (FTEs per man-month)

X_h = Number of operating hours (when providers are available per month)

Xx = Number of exam rooms per month

e= all other variance

Hypotheses Tested

The alternate hypotheses for this study were:

Ha_1: “Satisfaction with access to medical care (Q10b)” varies as a function of the ease of making an appointment by phone for specific clinics.

Ha_2: “Satisfaction with access to medical care (Q10b)” varies as a function of the wait time to get an appointment in specific clinics.

Ha_3: “Satisfaction with access to medical care (Q10b)” varies as a function of the number of providers in specific clinics.

Ha_4: “Satisfaction with access to medical care (Q10b)” varies as a function of the number of ancillary staff in specific clinics.

Ha_5: “Satisfaction with access to medical care (Q10b)” varies as a function of the number of operating hours per month in specific clinics.

Ha_6: “Satisfaction with access to medical care (Q10b)” varies as a function of the number of exam rooms in specific clinics.

The null hypotheses are that “satisfaction with access to medical care (Q10b)” will not vary as a function of the independent variables in these specific clinics.

Validity and Reliability

Reliability is the tendency to get the same results twice or the degree to which a measurement is free of random error (Lees-Haley, 1980). Reliable data means that it is consistent and reproducible in measurement. Internal consistency or reliability of the survey instrument was measured using Cronbach's coefficient alpha.

Validity refers to an instrument's ability to measure the right variable. Does the instrument measure what it is supposed to measure (Lees-Haley, 1980)? There are several different types of validity: content, face, and construct. Content validity is largely judgmental but it looks at whether the instrument provides adequate coverage of the topic under study. Each individual variable was derived from the literature but the total model of combining these variables contributes to the study of patient satisfaction by providing a new model derived from empirically validated, individual independent variables.

Face validity is defined as whether the questionnaire or question appears reasonable and appropriate to the examinee. Construct validity is determined after the study and is when the findings of the survey are the same as the concept (Lees-Haley, 1980). Validity of the model was determined using a correlation matrix (see Table 1) with the dependent variable "satisfaction with access to medical care (Q10b)" and the independent variables.

Ethical Considerations

The data for this study did not identify any individual provider, staff, or patient seen within BAMC. The database established to complete the analysis did, however, identify each clinic within BAMC by name as well as by the three-character MEPRS code.

Statistical Method

This study used correlation analysis and multiple linear regression to predict or estimate the value of the dependent variable that corresponds to the independent variables. Multiple linear regression has the advantage of focusing on multiple relationships, simultaneously showing the effects and magnitude, as well as determining the proportion of variability explained by the independent variables (Sanders, 1995). The alpha level was set at the $p = .05$ for the data analysis. Variables were entered into the Statistical Package for Social Sciences 9.0 for the analysis.

RESULTS

Cronbach's coefficient alpha was used to test the internal consistency or reliability of the CSS. Values for the alpha range between 0.00 and +1.00; high values = high internal consistency. For predictor studies, a reliability of .70 to .80 is sufficient (Johnson, 1998). Inter-item reliability of the 22 items was .8152.

Validity of the model was determined using a simple correlation matrix. A significant linear relationship exists between the dependent variable, "satisfaction with access to

medical care (Q10b)" and "ease of making an appointment by phone (Q10a)" r (2, 191) = .983, $p < .001$ and "the process of obtaining a referral for specialty care (Q10c)" r (2, 191) = .974, $p < .001$. These significant correlations demonstrate the validity of the model by their convergence on the construct.

The descriptive statistics for the sample population are presented in Table 1. The majority of patients (41%) were between the ages of 35-64 followed by those 65 and older (40%). The overall reported health status was good (35%) followed by very good (28%). Most patients were women (66%) and were dependents of retired military (49%) followed by retired military (27%). The majority of patients were enrolled in TRICARE Prime (62%). Thirty-four percent of the patients visited their clinic for the purpose of preventive care or a check-up followed by a routine or non-urgent care visit (28%). Fifty-eight percent of patients were enlisted between the rank of E-5 and E-9 followed by officers (32%). Most patients rated the "ease of making an appointment by phone (Q10a)" as excellent (35.5%) followed by very good (26%). Most patients (22%) waited between 15-30 days for their appointment followed by 21% waiting between 8-14 days. Finally, most patients rated their "satisfaction with access to medical care (Q10b)" as excellent (38.5%) followed by very good (25.5%).

Linear relationships of the independent variables to the dependent variable are presented in Table 2. With the exception of the beneficiary category "National Guard /Reserve," all of the independent variables show a significant correlation at the $p = .01$ level.

The patient demographic variables “gender,” “age,” “grade,” “beneficiary category,” “enrollment,” “health status,” and “purpose of visit” accounted for 96.6% (R^2 = .966) of the variation in the dependent variable “satisfaction with access to medical care (Q10b).” The independent variables “number of providers,” “number of ancillary staff,” “number of exam rooms,” “number of operating hours,” “wait time to appointment (Q6),” and “ease of making an appointment (Q10a)” were then added to the model. The total model accounted for 98.6% (R^2 = .986) of the variation in the dependent variable “satisfaction with access to medical care (Q10b).”

The Analysis of Variance (ANOVA) further validated the predictive value of and the variation accounted for by the total model (see Table 3). With an alpha level of p = .01, the total effects of the independent variables together were statistically significant $F(26,191) = 438.023$, $p < .001$.

Table 1

Descriptive Statistics for BAMC

	M	SD	Min	Max
Urgent purpose of visit (Q1)	.1455	.1560	.00	.67
Routine purpose of visit (Q1)	.1735	.1535	.00	.63
Check-up purpose of visit (Q1)	.2086	.2144	.00	.92
Specialty care purpose of visit (Q1)	.1017	.1530	.00	.71
Enrolled in TRICARE Prime (Q14)	.4256	.3366	.00	1.00
Gender	.2609	.2510	.00	.90
Age 0 – 17	.1383	.3250	.00	1.00
Age 18 – 34	.0589	.0843	.00	.40
Age 35 – 64	.2824	.2614	.00	.82
Age 65 and older	.2492	.2597	.00	.87
Grade – E1-E4	.0160	.0403	.00	.20
Grade – E5-E9	.1349	.1673	.00	.82
Warrant Officer	.0081	.0243	.00	.17
Officer	.0756	.0964	.00	.45
Active Duty military	.0494	.0777	.00	.33
Guard/Reserve	.0056	.0206	.00	.13
Retired military	.1799	.2197	.00	.80
Dependent Active Duty military	.1663	.2792	.00	1.00
Dependent Retired military	.3222	.2786	.00	1.00
Health status (Q17)	2.4469	1.5613	.00	4.67
Ease of making appt by phone (Q10a)	2.6790	1.6996	.00	4.86
Wait time to appointment (Q6)	3.2755	2.1977	.00	6.43
Number of providers	8.6117	5.3502	.00	21.58
Number of ancillary staff	12.3992	10.9232	.22	45.12
Number of operating hours	159.25	34.13	102	192
Number of exam rooms	14.1250	9.7005	3	29

n = 192

Table 2

Correlations Using Monthly Data from BAMC

	Satisfaction with access to medical care (Q10b)	
	Pearson Correlation	Sig. (2-tailed)
Urgent purpose of visit (Q1)	.564**	.000
Routine purpose of visit (Q1)	.664**	.000
Check-up purpose of visit (Q1)	.606**	.000
Specialty care purpose of visit (Q1)	.371**	.000
Enrolled in TRICARE Prime (Q14)	.749**	.000
Gender	.638**	.000
Age 0 – 17	.263**	.000
Age 18 – 34	.410**	.000
Age 35 – 64	.633**	.000
Age 65 - +	.582**	.000
Grade – E1-E4	.222**	.000
Grade – E5-E9	.509**	.000
Warrant Officer	.215**	.003
Officer	.480**	.000
Active Duty military	.390**	.000
Guard/Reserve	.138	.057
Retired military	.513**	.000
Dependent Active Duty military	.357**	.000
Dependent Retired military	.673**	.000
Health status (Q17)	.942**	.000
Process of obtaining a referral (Q10c)	.974**	.000
Ease of making appt by phone (Q10a)	.983**	.000
Wait time to appointment (Q6)	.885**	.000
Number of providers	.501**	.000
Number of ancillary staff	.257**	.000
Number of operating hours	.299**	.000
Number of exam rooms	.316**	.000

**Correlation is significant at the alpha = .01 level.
n = 192, df = 26, 191

Table 3

ANOVA

Model	SS	Df	MS	F	Sig.
Regression[a]	562.172	26	21.622	438.023	.000
Residual	8.145	165	4.936E-02		
Total	570.317	191			

[a]Predictors: Wait time, beneficiary category, grade, operating hours, purpose of visit, ease of making an appointment, enrollment, number of exam rooms, age, gender, number of providers, number of ancillary staff, health status

Finally, four independent variables were found to be statistically significant (see Table 4) and predictive of the dependent variable “satisfaction with access to medical care (Q10b).” “Ease of making an appointment (Q10a)” showed the highest statistical significance t (26, 191) = 13.549, p < .001, followed by the number of exam rooms t (26, 191) = -2.888, p = .004, an urgent visit t (26, 191) = 2.816, p = .005, and age 65 or older t (26, 191) = 2.169, p = .032.

Table 4

Regression Model Coefficients

Model	B	SE	t	Sig.
Constant	-.005	.106	-.043	.966
Purpose of Visit				
Urgent	.733	.260	2.816	.005**
Routine	.268	.265	1.011	.313
Specialty	.070	.254	.276	.783
Check-up	.327	.229	1.427	.156
Enrolled	.027	.120	.224	.823
Beneficiary category				
Active duty	-1.540	1.934	-.796	.427
Guard/reserve	-2.744	2.134	-1.286	.200
Retired	-1.671	1.919	-.871	.385
Depend. active duty	.222	.719	.309	.758
Depend. retired	.075	.701	.107	.915
Grade				
E1-4	2.157	1.924	1.121	.264
E5-9	1.866	1.845	1.012	.313
Warrant officer	2.603	1.945	1.338	.183
Officer	1.336	1.857	.719	.473
Age				
00-17	1.050	.742	1.416	.159
18-34	.486	.772	.629	.530
35-64	.983	.718	1.370	.173
65 and older	1.508	.695	2.169	.032*
Health status	.038	.071	.538	.591
Gender	-.265	.258	-1.028	.305
# Hours	.0008	.001	.939	.349
# exam rooms	-.011	.004	-2.888	.004**
# providers	-.008	.006	-1.300	.195
# ancillary staff	.001	.003	.573	.568
Ease of appt	.583	.043	13.549	.000**
Wait time	.035	.035	1.011	.313

F (26,191) = 438.023, $p < .001$.

DISCUSSION

The regression analysis provided empirical support (see Table 4) for the acceptance of alternate hypotheses one and six: “satisfaction with access to medical care (Q10b)” varies as a function of “ease of making an appointment (Q10a)” for specific clinics; and “satisfaction with access to medical care (Q10b)” varies as a function of the number of exam rooms in specific clinics. Therefore, alternate hypotheses two through five were rejected and the null hypotheses were accepted.

Of the two accepted alternate hypotheses, alternate hypothesis one, “satisfaction with access to medical care (Q10b)” varies as a function of “ease of making an appointment (Q10a)”, showed the highest statistical significance t (26, 191) = 13.549, $p < .001$. This is validated by the literature. Jatulis, Bundek, and Legoretta (1997) identified the strongest predictor of satisfaction with access to care as the ease of arranging appointments. Additional ways of making appointments are already being used in some MTFs. Web-based appointment systems are one example of an alternative method of making appointments that is currently in use at Naval Hospital Okinawa, Okinawa, Japan; and Bayne Jones Army Community Hospital, Ft Polk, Louisiana.

Naval Hospital Okinawa has reported an improvement in patient satisfaction, a decrease in the appointments made via the telephone, and a decrease in the frustration patients experience when reaching a busy signal when calling for an appointment. Kiosks with computers could also be established in high traffic areas such as the Post Exchange, Commissary, and the medical mall within BAMC. This method of making

appointments could also be used to track those that are unable to get a needed appointment, and those that choose to accept an appointment outside the access standards. This method may also help to reduce appointment no shows as patients can actually see the range of available appointments and are more involved with the process.

The total model also showed statistical significance t (26, 191) = -2.888, p = .004 for alternate hypothesis six “satisfaction with access to medical care (Q10b)” varies as a function of the number of exam rooms. Since definitive information is not available, assumptions can only be made as to why the more exam rooms a clinic had, the less satisfied patients were with access. This negative relationship may be due to the original assumption that the number of exam rooms was constant over the two-year period when the number of exam rooms may have varied.

The most statistically significant demographic predictors were the urgent visit t (26, 191) = 2.816, p = .005 and an age of 65 or older t (26, 191) = 2.169, p = .032. The statistical significance of the urgent visit in relation to access to medical care does make sense. The MHS has defined standards for access to healthcare. The maximum wait time to get an appointment within the MHS for urgent, routine, and specialty care, is one day, seven days, and thirty days respectively (Joseph, 1995). Additionally, the expectation exists that the more serious the problem, the quicker the patient should be seen – much like being triaged in an Emergency Room. The patient with the most life threatening problem is taken before the runny nose, no matter how long the runny nose has been waiting.

Several studies support age as a predictor of overall satisfaction (Young, Meterko, & Desai, 2000; Tucker & Kelley, 2000; Sixma, Preeuwenberg, & Van Der Pasch, 1998; Hall & Dornan, 1990). While this study did not specifically look at age in relation to overall satisfaction, a simple correlation matrix showed that as age increased there was an increase in the correlation (age 0-17, $r = .223$; age 18-34, $r = .438$; age 35-64, $r = .659$ with $p < .001$) to overall satisfaction. Age 65+ showed a slight decrease ($r = .614$. $p < .001$) in the correlation to overall satisfaction but remained significant. Kressin et al. (1999) found that older age was positively associated with three dimensions of satisfaction: location of healthcare facility, access to healthcare, and prescription services. In this Department of Veterans Affairs study, access to healthcare was defined as, “ease of making appointments for outpatient care by phone” with the possible response categories as excellent, very good, good, fair, and poor. This definition of ”access to healthcare” was almost identical to our CSS question 10a “ease of making an appointment by phone” with response categories as excellent, very good, good, fair, poor, and not applicable. Although this definition of access was not our focus, increasing age was found to be significantly correlated for age 35-64, $r (26, 191) = .633$, $p < .001$; and age 65+, $r (26, 191) = .582$, $p < .001$.

Finally, this study had several limitations. First, this study looked at a military medical facility in one region of the country. BAMC’s patient population is quite different from other facilities across the country. According to the Composite Health Care System equivalent lives summary for FY 98-99, 78% of BAMC’s population is retired or is a family member of a retired service member. Second, several assumptions were made. The first assumption was that clinic hours equated to the number of provider

hours available, which may not necessarily be the case. Physicians, particularly in the military, are involved in military unique duties throughout their duty day in addition to other normal administrative duties that detract from hours spent directly with patients. The second assumption was that the number of exam rooms, and clinic hours did not change over the two-year period. Clinics may have reorganized to increase exam rooms, added exam tables to provider offices, or extended their hours to accommodate beneficiaries. Additionally, a third assumption was that all exam rooms were used all the time.

CONCLUSION

In today's military medical environment, the patient can now choose where to get their healthcare. It has therefore become imperative that beneficiaries are satisfied with access to their healthcare or they will seek that healthcare outside the MHS. The results of this study show a direction for improving patient satisfaction with access to medical care by improving the ease of making appointments by phone.

RECOMMENDATIONS

The recommendation from this study is that the "ease of making an appointment (Q10a)" should be further studied. Additionally, as the MHS moves quickly to realign staffing and resource allocation to deliver the most health services to the maximum number of beneficiaries, we should consider in our optimization efforts those solutions that utilize widely available and portable technology.

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